

REMARKS

Reconsideration and allowance of this application are respectfully requested in light of the above amendments and the following remarks.

Claims 22-28 have been amended. Support for the amendments is provided at least in the specification at page 8, lines 8-20.

Claims 22 and 24-28 were rejected, under 35 USC §103(a), as being unpatentable over Sunaga (US 6,381,233) in view of Hakkinen et al. (US 6,282,185). Claim 23 was rejected, under 35 USC §103(a), as being unpatentable over Sunaga in view of Hakkinen and Ziv et al. (US 5,867,527). To the extent these rejections may be deemed applicable to amended claims 22-28, the Applicant respectfully traverses based on the points set forth below.

Claim 22 now recites: (1) spreading a known signal and spreading transmission signals using the same spreading factor (i.e, number of chips per symbol), (2) assigning each chip of a spread symbol of the known signal to a different subcarrier of an OFDM-CDMA transmission signal, which has the same number of subcarriers as the spreading factor has chips per symbol, and (3) simultaneously transmitting all chips of the spread symbol of the known signal. These claimed features provide an advantage of transmitting all chips of a known signal symbol simultaneously, with each chip of the symbol communicated by a different

subcarrier. Since a receiver may detect the residual phase error of a received signal based on the reception of a single symbol, the claimed subject matter provides the advantage of reducing the time required to detect the phase error of a received signal to that required to receive a single chip. The memory requirements for storing information related to detecting the phase error is similarly reduced. Moreover, by applying the same spreading factor to both the known signal and transmission signals, the claimed invention provides high orthogonality between the transmission signals and the known signal so that both may be received well. It is submitted that the applied references, considered alone or together, fail to suggest these features or the benefits they provide.

The Office Action proposes that Sunaga discloses spreading a known signal with one spreading code and spreading transmission signals with spreading codes that differ from the one applied to the known signal (see Office Action page 3, lines 1-4). Additionally, the Office Action proposes that Sunaga discloses multiplexing the spread known signals and spread transmission signals so that they may be simultaneously transmitted over the same frequency band (page 3, lines 5-8).

However, the Office Action does not propose that Sunaga discloses (1) spreading a known signal and spreading transmission

signals using the same spreading factor (i.e, number of chips per symbol), (2) assigning each chip of a spread symbol of the known signal to a different subcarrier of an OFDM-CDMA transmission signal, which has the same number of subcarriers as the spreading factor has chips per symbol, and (3) simultaneously transmitting all chips of the spread symbol of the known signal. Moreover, the Applicant submits that such a disclosure does not exist in Sunaga's specification.

Similarly, Hakkinen also does not disclose or suggest these features. Instead, Hakkinen discloses, in Fig. 3, spreading transmission data with a spreading code having M chips per symbol, multiplexing the spread signal with other signals, and modulating the multiplexed signals with $K < M$ subcarriers of an OFDMA communication signal (see Hakkinen col. 5, lines 35-40). Since Hakkinen discloses that the number of subcarriers, K , is less than the number of chips per symbol, M , of the spreading code applied to the data within the multiplexed signal, it necessarily follows that Hakkinen does not disclose the claimed features of: (1) applying a spreading factor having the same number of chips per symbol as the number of subcarriers and (2) assigning each chip of a spread symbol of the known signal to a different subcarrier. Thus, it also follows that Hakkinen's

system cannot simultaneously transmit all chips of a spread symbol of a known signal, as recited in claim 22.

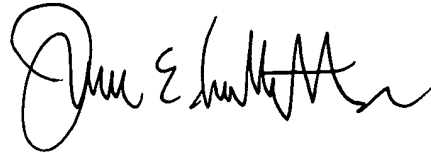
Accordingly, the Applicant respectfully submits that the combined teachings of the applied references do not teach or suggest the subject matter defined by claim 22. Claim 27 similarly recites the above-described features distinguishing apparatus claim 22 from the applied references, but with respect to a method. Claim 25 recites a receiver that performs the inverse operations to those performed by the transmitter of claim 22, with respect to the above-described features distinguishing claim 22 from the applied references. Claim 28 similarly recites the above-mentioned features distinguishing apparatus claim 25 from the applied references, but with respect to a method. Claims 25 and 26 recite the above-mentioned features distinguishing claims 22 and 24 from the applied references. Therefore, allowance of claims 22 and 24-28 and dependent claim 23 is warranted.

In view of the above, it is submitted that this application is in condition for allowance, and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone

the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "James E. Ledbetter", with a stylized, cursive script.

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JEL/DWW/att

James E. Ledbetter
Registration No. 28,732

Attorney Docket No. JEL 31211
STEVENS DAVIS, MILLER & MOSHER, L.L.P.
1615 L Street, N.W., Suite 850
P.O. Box 34387
Washington, D.C. 20043-4387
Telephone: (202) 785-0100
Facsimile: (202) 408-5200